

Chemical Analysis Report

WQAP-2023-06-29-01

Florida DEP Laboratory
2600 Blair Stone Road
Tallahassee, FL 32399-2400
DOH Accreditation E31780

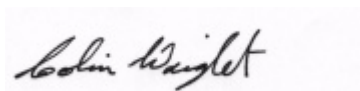
Event Description: **Algal Bloom Response - SE ROC**
Request ID: **RQ-2023-03-27-45**
Customer: **WQAP**
Project ID: **BLOOM-RESP**

Send Reports to:
FL Dept. of Environmental Protection
2199 South Rock Road
Fort Pierce, FL 34945
Attn: Jordan Skaggs

For additional information please contact
Colin Wright, Ph.D.
Chris Bowen, B.S.
Kerry Tate, Ph.D.
Dr. rer. nat. Bettina Steinbock
Thekkekalathil Chandrasekhar, Ph.D, QA Officer
Phone (850) 245-8085

Certified by: Colin Wright, Program Administrator

Date Certified: 14-JUL-2023 08:15

A handwritten signature in black ink, appearing to read "Colin Wright", is displayed on a light pink rectangular background.

Case Narrative

Unless otherwise noted, all samples included in this report were received in accordance with protocols referenced in Chapter 62-160, Florida Administrative Code (F.A.C.). Results published in this report pertain only to the samples as submitted to, and received by the laboratory. All times in this report are adjusted to the applicable Eastern Time Zone (EST or EDT).

Results for the following analytical groups are included in this report: Nutrients and Pesticides.

Scientific notation may be used in reporting very large or small values. Values reported using scientific notation will take the form of the following example: 1.3E+03, which is equivalent to 1.3×10^3 or 1300.

Unless otherwise noted, analytical values for soil and sediment samples are reported on a dry weight basis, and analytical values for waste and tissue samples are reported on a wet weight basis.

Results for TNI accredited tests met requirements established by The NELAC Institute. A double asterisk (**) is used to indicate an analyte/matrix/method for which the laboratory is not TNI accredited by the Florida Department of Health Environmental Laboratory Certification Program or where accreditation for that field of testing is not applicable.

Any significant anomalies or deviations from established protocols are documented in Non-Conformance Reports, which, where appropriate, are included within this analytical report. Additional comments related to specific analytical tests may be included as remarks following the analytical results for each sample. Such comments and remarks are for informational purposes only and are not intended to convey judgement about the usability of the reported data.

A quality control report on the performance of the test method for the submitted samples is included. Uncertainty associated with the analytical results contained in this report can be estimated from the reported quality assurance results and from published quality control acceptance limits for each analytical test. Matrix quality control results (matrix spike recoveries and matrix sample precision) pertain only to the matrix sample tested and do not necessarily reflect test method performance for other samples.

Typical matrix quality control (QC) measurements may include matrix spike recovery, matrix spike duplicate recovery, matrix spike precision and matrix sample precision. Not all matrix QC results may be available or reportable; where they are not an explanation is provided. Typical reasons for unavailable QC results include, but are not limited to, a) insufficient matrix sample to perform some or all QC measurements; b) analyte concentration in the sample replicated was too low for a meaningful measurement of precision and c) analyte concentration in the matrix sample spiked was too high (relative to the amount of analyte spiked) for a meaningful measurement of recovery. Where matrix QC results are unavailable, other method performance metrics (e.g., LCS recovery, LCS precision, surrogate recovery) may be used to assess performance of the method. Comments explaining any missing QC measurements are not intended to convey any adverse conclusions about the quality of the reported data.

Precision is reported as relative percent difference unless otherwise noted.

Quality Control codes as defined below may be used in this report to indicate results that are associated with one or more quality control elements which did not fall within established test method criteria. Such results may be qualified as estimates using a J qualifier as required by 62-160 F.A.C. Explanations are included in the report for any results that were reported as estimates for other reasons.

QC Codes used in this report may include:

- LCS – Recovery for the batch Laboratory Control Sample (LCS) was outside existing control limits;
- MS – Recovery for the batch matrix spike (MS) was outside existing control limits;
- CCV – Recovery for a continuing calibration verification (CCV) standard was outside existing control limits;
- SUR – Recovery of a surrogate (SUR) for associated analytes was outside existing control limits;
- RPD – The precision, measured as relative percent difference (RPD), of batch replicate measurements was outside existing control limits;
- RSD – The precision, measured as relative standard deviation (RSD), of batch replicate measurements was outside existing control limits;
- SMP – Sample - used precision derived from replicate analyses of a sample;

The following data qualifiers are used, where applicable, in this report as specified in 62-160 F.A.C.

- A - Value reported is the mean of two or more determinations.
- B - Results based on colony counts outside the acceptable range.
- I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.
- J - Estimated value and/or the analysis did not meet established quality control criteria.
- K - Actual value is known to be less than value given.
- L - Actual value is known to be greater than value given.
- N - Presumptive evidence of presence of material.
- O - Sampled, but analysis lost or not performed.
- Q - Sample held beyond normal holding time.
- T - Value reported is less than the criterion of detection.
- U - Material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.
- V - Analyte was detected in both sample and method blank.
- X - Too few individuals to calculate SCI value.
- Y - The laboratory analysis was from an unpreserved or improperly preserved sample. The data may not be accurate.
- Z - Colonies were too numerous to count (TNTC).

Quality control information from overflow laboratories may not be included in this report. Please refer to the associated report from the overflow laboratory for additional information.

Sample Location: Lake Okeechobee - Pahokee Marina

Collection Date/Time: 06/28/2023 10:00

Field ID: SEHAB0017

Matrix: W-SURF-FRH

Sample ID	Ref. Method	Component	Result	Code	Units	Batch ID	QC Codes
2420510	EPA 8321B	Anatoxin-a	0.25	U	ug/L	P431921	
		Cylindrospermopsin	0.10	U	ug/L	P431920	
		Desmethyl microcystin LR	0.25	U	ug/L	P431920	
		Microcystin HILR	0.25	U	ug/L	P431920	
		Microcystin HtyR	0.25	U	ug/L	P431920	
		Microcystin LA	0.13	I	ug/L	P431920	
		Microcystin LF	0.10	U	ug/L	P431920	
		Microcystin LR	2.3		ug/L	P431920	
		Microcystin LW	0.25	U	ug/L	P431920	
		Microcystin LY	0.10	U	ug/L	P431920	
		Microcystin RR	0.10	U	ug/L	P431920	
		Microcystin WR	0.50	U	ug/L	P431920	
		Neosaxitoxin	0.50	U	ug/L	P431921	
		Microcystin YR	0.25	U	ug/L	P431920	
		Saxitoxin	0.50	U	ug/L	P431921	
		Nodularin-R	0.10	U	ug/L	P431920	
2420513	EPA 350.1 Rev. 2.0	Ammonia-N	0.068		mg N/L	P432121	
	EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	1.0		mg N/L	P432099	
	EPA 353.2 Rev. 2.0	NO2NO3-N	0.023		mg N/L	P432159	
	EPA 365.1 Rev. 2.0	Total-P	0.17		mg P/L	P432067	
2420514	EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	0.088		mg P/L	P431942	

Quality Assurance Report Method Blank Results

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P432121

Component	Result	Code	Units
Ammonia-N	0.002	U	mg N/L

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P432099

Component	Result	Code	Units
Kjeldahl Nitrogen	0.080	U	mg N/L

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P432159

Component	Result	Code	Units
NO2NO3-N	0.004	U	mg N/L

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P432067

Component	Result	Code	Units
Total-P	0.002	U	mg P/L

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P431942

Component	Result	Code	Units
O-Phosphate-P	0.004	U	mg P/L

Reference Method: EPA 8321B
Batch ID: P431920

Component	Result	Code	Units
Cylindrospermopsin	0.10	U	ug/L
Desmethyl microcystin LR	0.25	U	ug/L
Microcystin H1LR	0.25	U	ug/L
Microcystin HtyR	0.25	U	ug/L
Microcystin LA	0.10	U	ug/L
Microcystin LF	0.10	U	ug/L
Microcystin LR	0.25	U	ug/L
Microcystin LW	0.25	U	ug/L
Microcystin LY	0.10	U	ug/L
Microcystin RR	0.10	U	ug/L
Microcystin WR	0.50	U	ug/L
Microcystin YR	0.25	U	ug/L
Nodularin-R	0.10	U	ug/L

Reference Method: EPA 8321B
Batch ID: P431921

Component	Result	Code	Units
Anatoxin-a	0.25	U	ug/L
Neosaxitoxin	0.50	U	ug/L
Saxitoxin	0.50	U	ug/L

Quality Assurance Report Laboratory Control Sample Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P432121

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Ammonia-N	93.2		P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P432099

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Kjeldahl Nitrogen	107		P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P432159

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
NO2NO3-N	102		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P432067

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Total-P	99.4		P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P431942

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
O-Phosphate-P	101		P	90 - 110

Reference Method: EPA 8321B
Batch ID: P431920

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Cylindrospermopsin	94.9		P	40 - 160
Desmethyl microcystin LR	85.4		P	40 - 160
Microcystin H1R	80.6		P	40 - 160
Microcystin HtyR	88.2		P	40 - 160
Microcystin LA	90.0		P	40 - 160
Microcystin LF	71.4		P	40 - 160
Microcystin LR	72.4		P	40 - 160
Microcystin LW	72.3		P	40 - 160
Microcystin LY	73.2		P	40 - 160
Microcystin RR	89.4		P	40 - 160
Microcystin WR	86.0		P	40 - 160
Microcystin YR	77.2		P	40 - 160
Nodularin-R	83.3		P	40 - 160

Reference Method: EPA 8321B
Batch ID: P431921

Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
Anatoxin-a	92.5		P	40 - 150
Neosaxitoxin	79.5		P	40 - 150
Saxitoxin	81.9		P	40 - 150

Quality Assurance Report Matrix Spike Accuracy

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P432121

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2420508	Ammonia-N	91.2	92.8	P/P	90 - 110

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P432099

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2420363	Kjeldahl Nitrogen	102	104	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P432159

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2420508	NO2NO3-N	101	100	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P432067

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2420586	Total-P	99.9	99.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P431942

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2420367	O-Phosphate-P	102	100	P/P	90 - 110

Reference Method: EPA 8321B
Batch ID: P431920

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2420409	Cylindrospermopsin	94.3	84.2	P/P	40 - 160
2420409	Desmethyl microcystin LR	93.7	84.8	P/P	40 - 160
2420409	Microcystin HiLR	86.6	80.4	P/P	40 - 160
2420409	Microcystin HtyR	92.6	83.3	P/P	40 - 160
2420409	Microcystin LA	95.6	90.8	P/P	40 - 160
2420409	Microcystin LF	79.5	80.3	P/P	40 - 160
2420409	Microcystin LR	80.8	78.3	P/P	40 - 160
2420409	Microcystin LW	82.4	73.2	P/P	40 - 160
2420409	Microcystin LY	81.0	71.9	P/P	40 - 160
2420409	Microcystin RR	90.8	85.3	P/P	40 - 160
2420409	Microcystin WR	90.3	87.9	P/P	40 - 160
2420409	Microcystin YR	78.3	77.1	P/P	40 - 160
2420409	Nodularin-R	91.5	84.7	P/P	40 - 160

Reference Method: EPA 8321B
Batch ID: P431921

Spiked Sample	Component	% Rec.1	% Rec.2	Pass/Fail	Control Limits
2420409	Anatoxin-a	95.5	88.0	P/P	40 - 150
2420409	Neosaxitoxin	66.0	62.4	P/P	40 - 150
2420409	Saxitoxin	72.8	68.7	P/P	40 - 150

Quality Assurance Report Precision

Reference Method: EPA 350.1 Rev. 2.0
Batch ID: P432121

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2420508	Ammonia-N	1.54	Spike	P	0 - 20

Reference Method: EPA 351.2 Rev. 2.0
Batch ID: P432099

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2420363	Kjeldahl Nitrogen	1.32	Spike	P	0 - 20

Reference Method: EPA 353.2 Rev. 2.0
Batch ID: P432159

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2420508	NO2NO3-N	0.995	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0
Batch ID: P432067

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2420586	Total-P	0.146	Spike	P	0 - 20

Reference Method: EPA 365.1 Rev. 2.0 dissolved
Batch ID: P431942

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2420367	O-Phosphate-P	1.46	Spike	P	0 - 20

Reference Method: EPA 8321B
Batch ID: P431920

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2420409	Cylindrospermopsin	11.3	Spike	P	0 - 30
2420409	Desmethyl microcystin LR	10.0	Spike	P	0 - 30
2420409	Microcystin HiLR	7.37	Spike	P	0 - 30
2420409	Microcystin HtyR	10.6	Spike	P	0 - 30
2420409	Microcystin LA	5.17	Spike	P	0 - 30
2420409	Microcystin LF	0.961	Spike	P	0 - 30
2420409	Microcystin LR	3.06	Spike	P	0 - 30
2420409	Microcystin LW	11.8	Spike	P	0 - 30
2420409	Microcystin LY	12.0	Spike	P	0 - 30
2420409	Microcystin RR	6.21	Spike	P	0 - 30
2420409	Microcystin WR	2.74	Spike	P	0 - 30
2420409	Microcystin YR	1.63	Spike	P	0 - 30
2420409	Nodularin-R	7.71	Spike	P	0 - 30

Quality Assurance Report Precision

Reference Method: EPA 8321B
Batch ID: P431921

Replicated Lab Sample	Component	% RSD/RPD	Sample/Spike/LCS*	Pass/Fail	Control Limits
2420409	Anatoxin-a	8.19	Spike	P	0 - 30
2420409	Neosaxitoxin	5.68	Spike	P	0 - 30
2420409	Saxitoxin	5.69	Spike	P	0 - 30

* Sample, spike and/or laboratory control sample precision (LCS) is reported.

Quality Assurance Report Surrogates

Lab Sample ID: 2420510
Field Sample ID: SEHAB0017

Reference Method	Surrogate	% Rec.	Pass/Fail	Control Limits
EPA 8321B	Microcystin LR ethyl-d5	59.2	P	30 - 160
EPA 8321B	Saxitoxin-15N7	65.4	P	30 - 160

Quality Assurance Report Calibration Verification

Reference Method: EPA 365.1 Rev. 2.0 dissolved

Run ID: A120099

Included Lab Sample IDs: 2420514

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
O-Phosphate-P	98.7	98.9	P/P	90 - 110

Reference Method: EPA 8321B

Run ID: A120105

Included Lab Sample IDs: 2420510

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Anatoxin-a	89.6	89.6	P/P	50 - 160
Neosaxitoxin	81.5	79.7	P/P	50 - 160
Saxitoxin	84.1	83.0	P/P	50 - 160

Reference Method: EPA 8321B

Run ID: A120106

Included Lab Sample IDs: 2420510

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Cylindrospermopsin	91.0	94.2	P/P	60 - 160
Desmethyl microcystin LR	84.8	82.7	P/P	50 - 160
Microcystin H1R	80.8	80.3	P/P	60 - 160
Microcystin HtyR	84.6	84.4	P/P	60 - 160
Microcystin LA	88.5	89.8	P/P	50 - 160
Microcystin LF	68.9	66.4	P/P	60 - 160
Microcystin LR	69.3	73.7	P/P	60 - 160
Microcystin LW	63.7	62.1	P/P	60 - 160
Microcystin LY	76.4	70.0	P/P	60 - 160
Microcystin RR	87.0	86.8	P/P	60 - 160
Microcystin WR	74.9	79.2	P/P	60 - 160
Microcystin YR	72.3	70.5	P/P	60 - 160
Nodularin-R	81.8	85.0	P/P	60 - 160

Reference Method: EPA 350.1 Rev. 2.0

Run ID: A120189

Included Lab Sample IDs: 2420513

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Ammonia-N	96.9	96.8	P/P	90 - 110

Reference Method: EPA 365.1 Rev. 2.0

Run ID: A120213

Included Lab Sample IDs: 2420513

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Total-P	101	101	P/P	90 - 110

Reference Method: EPA 353.2 Rev. 2.0

Run ID: A120222

Included Lab Sample IDs: 2420513

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
NO2NO3-N	103	102	P/P	90 - 110

Quality Assurance Report

Calibration Verification

Reference Method: EPA 351.2 Rev. 2.0

Run ID: A120224

Included Lab Sample IDs: 2420513

Component	% Rec.1	% Rec.2	Pass/Fail*	Control Limits
Kjeldahl Nitrogen	104	104	P/P	90 - 110

* Pass/Fail determinations are made for each bracketing calibration verification check.

Control limits for initial calibration checks may be different from those for continuing checks, depending on method requirements.

Where they are different, both control limits are provided.

Quality Assurance Report Summary

Ref. Method	Analyte	LCS % Recovery	MS % Recovery		Precision SMP	MS
			LCS	MS		
EPA 350.1 Rev. 2.0	Ammonia-N	93.2	91.2	92.8		1.54
EPA 351.2 Rev. 2.0	Kjeldahl Nitrogen	107	102	104		1.32
EPA 353.2 Rev. 2.0	NO2NO3-N	102	101	100		0.995
EPA 365.1 Rev. 2.0	Total-P	99.4	99.9	99.8		0.146
EPA 365.1 Rev. 2.0 dissolved	O-Phosphate-P	101	102	100		1.46
EPA 8321B	Anatoxin-a	92.5	95.5	88.0		8.19
	Cylindrospermopsin	94.9	94.3	84.2		11.3
	Desmethyl microcystin LR	85.4	93.7	84.8		10.0
	Microcystin HiLR	80.6	86.6	80.4		7.37
	Microcystin HtyR	88.2	92.6	83.3		10.6
	Microcystin LA	90.0	95.6	90.8		5.17
	Microcystin LF	71.4	79.5	80.3		0.961
	Microcystin LR	72.4	80.8	78.3		3.06
	Microcystin LW	72.3	82.4	73.2		11.8
	Microcystin LY	73.2	81.0	71.9		12.0
	Microcystin RR	89.4	90.8	85.3		6.21
	Microcystin WR	86.0	90.3	87.9		2.74
	Microcystin YR	77.2	78.3	77.1		1.63
	Neosaxitoxin	79.5	66.0	62.4		5.68
	Nodularin-R	83.3	91.5	84.7		7.71
	Saxitoxin	81.9	72.8	68.7		5.69

Reference Method Descriptions

Method	Description	Associated Samples
EPA 350.1 Rev. 2.0	Ammonia in aqueous matrices as mg N/L	2420513
EPA 351.2 Rev. 2.0	Total Kjeldahl Nitrogen in aqueous matrices	2420513
EPA 353.2 Rev. 2.0	Nitrite/Nitrate in aqueous matrices as mg N/L	2420513
EPA 365.1 Rev. 2.0	Total Phosphorus in aqueous matrices as mg P/L	2420513
EPA 365.1 Rev. 2.0 dissolved	Ortho-phosphate, dissolved, in filtered, aqueous matrices as mg P/L	2420514
EPA 8321B	Microcystins in water matrices by HPLC/MS/MS	2420510
EPA 8321B	Saxitoxin in water matrices by HPLC/MS/MS	2420510

Preparation and Analysis Log

Ref. Method	Received Date	Prep Date/Time	Prepared By	Analysis Date/Time	Analyzed By	Associated Samples
EPA 350.1 Rev. 2.0	06/29/2023			07/06/2023 13:48	Khloe J Berg	2420513
EPA 351.2 Rev. 2.0	06/29/2023	07/06/2023 12:18	Dana G. Hughes	07/07/2023 10:33	Samantha L Bates	2420513
EPA 353.2 Rev. 2.0	06/29/2023			07/07/2023 09:26	Beverly Y. Sanders	2420513
EPA 365.1 Rev. 2.0	06/29/2023	07/06/2023 15:43	Alexis Price	07/07/2023 10:14	Chandler E Cox	2420513
EPA 365.1 Rev. 2.0 dissolved	06/29/2023			06/29/2023 13:56	James L Waggerby	2420514
EPA 8321B	06/29/2023	06/29/2023 11:30	Hana Lee	06/29/2023 20:19	Juyoung Kim	2420510
	06/29/2023	06/29/2023 12:00	Hana Lee	06/30/2023 00:45	Tae K Lee	2420510